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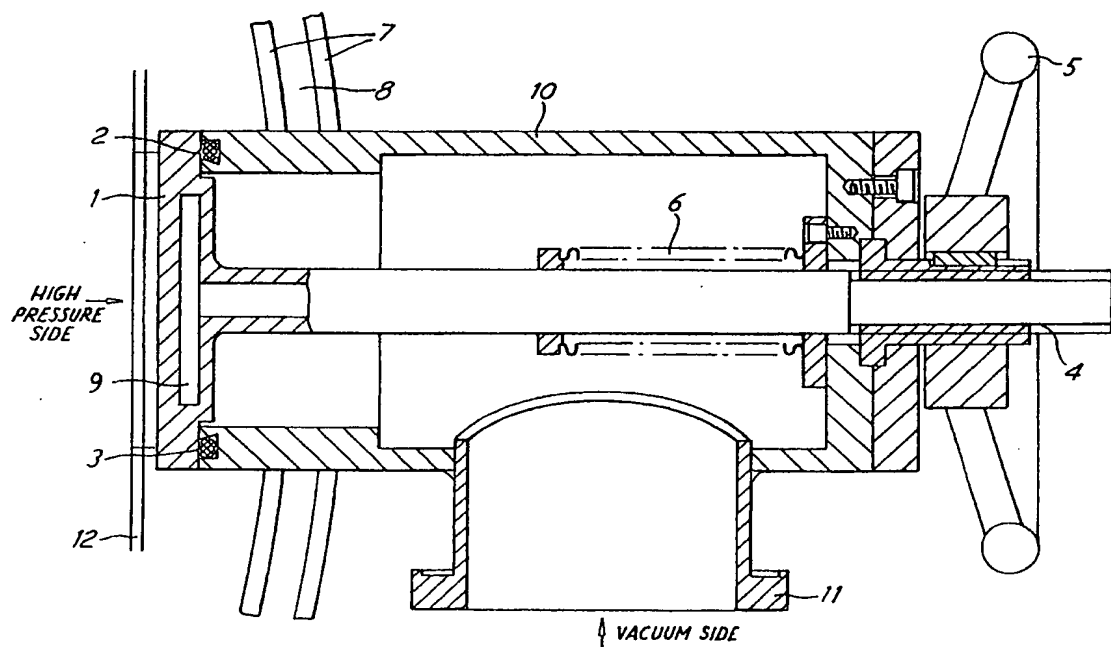
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(58) Field of search

F2V

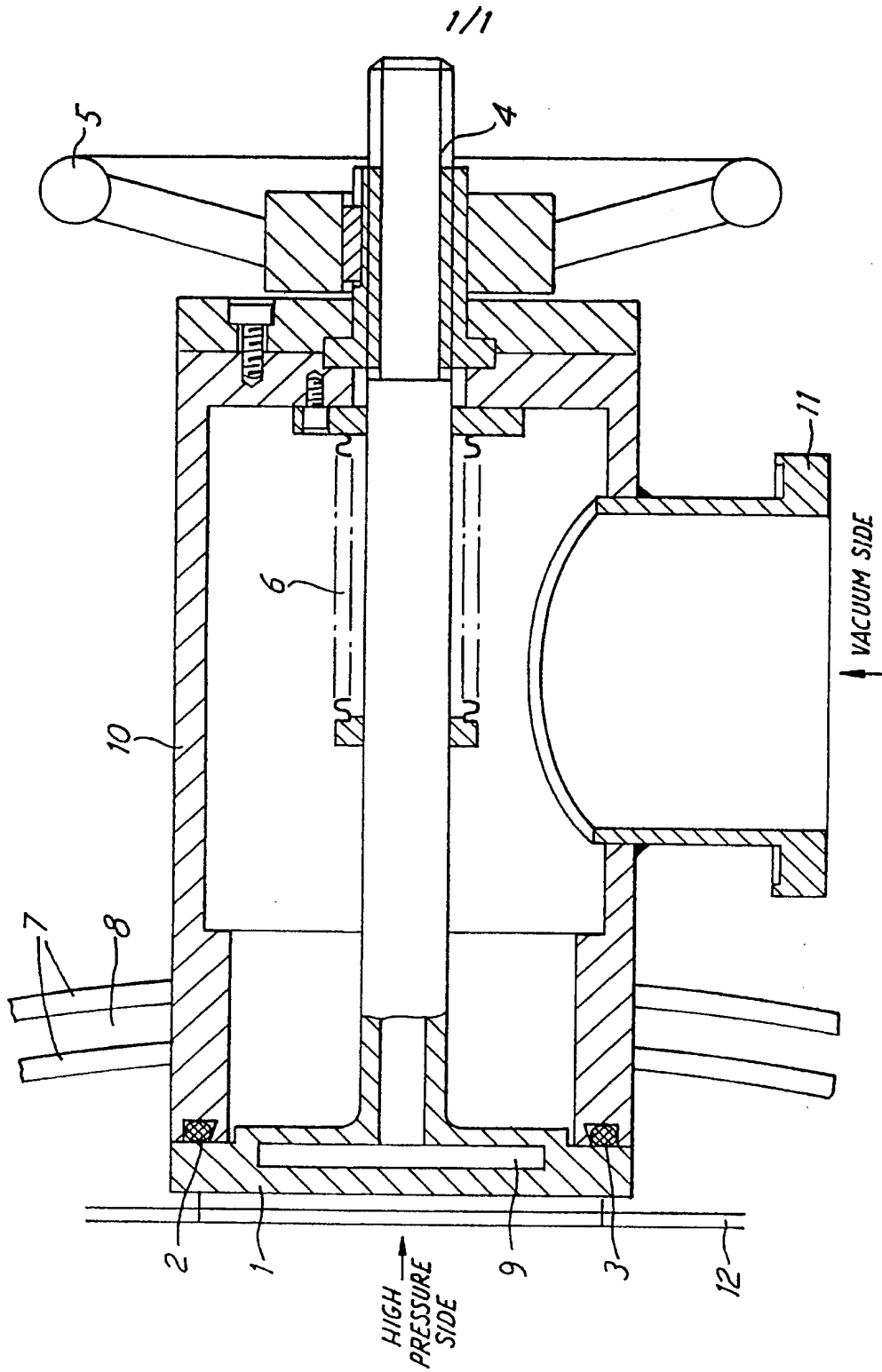
(54) Pressure valve

(57) A high pressure vacuum valve serves as a connection element between a high pressure container and a vacuum container and comprises a valve head 1 urged by the high pressure against a seal 2. Water cooling means 8 and 9 are provided for the valve seating and head, and a thermal radiation shield 12 may be provided in the high pressure container, which may be used for the thermal treatment of metal or ceramic materials.



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SPECIFICATION

Pressure valve

- 5 The invention concerns a pressure valve and more particularly a vacuum-tight high pressure valve which may serve as a connection element between a high pressure container and a vacuum container for use in vacuum plants for the thermal treatment of metals and ceramics.

10 In metallurgical plants for the thermal treatment of metals and ceramics under vacuum and under high pressure (ca. 100 bar), there is required a sealing element between the containers, which element can be selectively under vacuum or high pressure, and a vacuum pump or pipe.

15 Valves are known which are suitable for different respective pressure stages from the high vacuum range to the high pressure range. If a valve is to be used simultaneously for the vacuum range and the high pressure range, then up to now the entire valve body had to be designed for the full operating pressure. This requires an expensive construction and large external dimensions. Moreover the valves existing up to now are vacuum tight to the exterior, for example by the use of spring bellows. However in the passage they are not sufficiently vacuum tight over long periods because of the construction and the materials used.

20 A valve which is provided for separating and connecting a high vacuum region and a high pressure region is described in DE-OS 14 50 586. Here one side is designed for high vacuum and the other side for high pressure. The slide valve disclosed has a number of disadvantages. For example, the side of the slide adjacent to the vacuum must be lubricated in order to avoid seizing up and to permit efficient sliding. Because of the vapour pressure of the lubricating medium the vacuum is impaired and/or the remaining atmosphere is polluted. The high pressure seal is subjected to a shearing action by the sliding movement, which can lead to the destruction of the sealing ring.

25 The present invention seeks to overcome or reduce one or more of the above disadvantages. The present invention also seeks to provide a simply constructed valve of small size, which is suitable for use in high pressure plants and, regarding conductance and tightness, also in vacuum plants.

30 According to the present invention there is provided a valve for use as a connection element between a high pressure container and a low pressure or vacuum container, having a valve head which is moved at right angles to a sealing surface, the valve head being urged by the pressure from the side of the high pressure container against the valve seating.

Thus the valve head which is moved perpendicularly to the sealing surface is pressed into the valve seating by means of an over pressure from the high pressure side, so that all other components of the valve are located outside the high pressure region and may be designed for operation in vacuum. The valve seating is preferably an integral component of the inner wall of the high pressure container.

35 The advantages of the above arrangement are to be found in a simple and compact construction and above all in the fact by far the largest part of the valve does not need to be designed for high pressure, which would mean a higher expenditure on construction, material and required space. Moreover sliding movements of the sealing surfaces, as in a slide valve, are avoided.

40 Where the valve is provided for use in thermal treatment ovens, it is subject to high temperatures. Thus as a further development of the invention water cooling means may be provided at the valve head and/or at the valve seating. To protect the valve head and the valve seating from thermal radiation, which can emerge from the interior of the high pressure container, there is further provided a radiation shielding sheet on the inside of the high pressure container.

45 A preferred embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawing.

50 Valve head 1 is pressed by the high pressure side against the sealing surface 2. The sealing is achieved with a sealing ring 3. The valve head is moved with the help of a handwheel 5 via a threaded spindle 4 perpendicular to the sealing surface 2.

55 With the help of a spring bellows 6 the valve is sealed vacuum tight to the exterior. In the wall 7 of the high pressure container there is located a cooling chamber 8 for cooling the valve seating. Water cooling means 9 is provided for the valve head. The valve housing 10 is connected via a vacuum connection 11 to an evacuation arrangement. A radiation shielding sheet 12 protects the valve seating and the valve head from thermal radiation.

CLAIMS

1. A valve for use as a connection element between a high pressure container and a low pressure or vacuum container, having a valve head which is moved at right angles to a sealing surface, the valve head being urged by the pressure from the side of the high pressure container against the valve seating.

2. A valve according to claim 1, wherein, except for the valve head and the valve seating, all other parts of the valve are not designed for high pressure operation.

3. A valve according to claim 1 or 2, wherein except for the valve head and the valve seating, all other parts are designed for

vacuum operation.

4. A valve according to any preceding claim, wherein the valve seating is provided with water cooling means.
- 5 5. A valve according to any preceding claims, wherein the valve head is provided with water cooling means.
6. A valve according to any preceding claim, wherein the valve head and the valve seating are protected from thermal radiation by a shielding sheet.
- 10 7. A valve substantially as herein described with reference to the accompanying drawing.
- 15 8. Apparatus comprising a high pressure container and a low-pressure or vacuum container, the two containers being interconnected by a valve according to any preceding claim.
- 20 9. Apparatus according to claim 8, wherein the valve seating is an integral part of the inner wall of the high pressure container.
10. As an independent invention, the additional feature of any of claims 2 to 9.